IN THE CLAIMS

Claims 29-42 have been amended herein.

The following listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Previously Presented) A system, comprising:

a first executing process that:

implements a first continuous-time model to simulate a first subsystem, the first model being programmed in a first language and having a first state variable; and

sends a first series of state-related ~~messages~~ numerical values, each ~~message~~ numerical value reflecting information relating to the value of the first state variable at a different point t_m in simulation time in the first model; and

a second executing process that:

receives said first series of state-related ~~messages~~ numerical values; and

implements a second continuous-time model to simulate a second subsystem, the second model being programmed in a second language and taking as an input the value of the first state variable from said first series of state-related ~~messages~~ numerical values.

2. (Previously Presented) The system of claim 1, wherein:

the second model has a second state variable;

said second process further sends a second series of state-related ~~messages~~ numerical values, each ~~message~~ numerical value reflecting information relating to the value of the second state variable at a different point t_n in simulation time in the first model;

said first process further receives said second series of state-related ~~messages~~ numerical values; and

the first model takes as an input the value of the second state variable from said second series of state-related ~~messages~~ numerical values.

3. (Previously Presented) The system of claim 2, wherein for at least a first ~~message~~ numerical value in said first series of state-related ~~messages~~ numerical values, said first ~~message~~ numerical value reflecting information relating to the value of the first state variable at point t_1 in simulation time in the first model, there is a second ~~message~~ numerical value in said second series of state-related ~~messages~~ numerical values that reflects the value of the second state variable at point t_1 in simulation time in the first model.

4. (Previously Presented) The system of claim 2, wherein for at least a first ~~message~~ numerical value in a series of state-related ~~messages~~ numerical values, said first ~~message~~ numerical value reflecting the value of the first state variable at point t_1 in simulation time, there is no second ~~message~~ numerical value in said second series of state-related ~~messages~~ numerical values that reflects the value of the second state variable at point t_1 in simulation time.

5. (Previously Presented) The system of claim 1, wherein:

said first series of state-related ~~messages~~ numerical values comprises

a first ~~message~~ numerical value reflecting information relating to the value of the first state variable at time t_1 in simulation time in the first model;

a second ~~message~~ numerical value reflecting information relating to the value of the first state variable at time t_2 in simulation time in the first model; and

a third ~~message~~ numerical value reflecting information relating to the value of the first state variable at time t_3 in simulation time in the first model; and

wherein the first ~~message~~ numerical value, second ~~message~~ numerical value, and third ~~message~~ numerical value are consecutive within said first series of state-related ~~messages~~ numerical values; and $t_2-t_1 = t_3-t_2$.

6. (Previously Presented) The system of claim 1, wherein:

said first series of state-related ~~messages~~ numerical values comprises

a first ~~message~~ numerical value reflecting information relating to the value of the first state variable at time t_1 in simulation time in the first model;

a second ~~message~~ numerical value reflecting information relating to the value of the first state variable at time t_2 in simulation time in the first model; and

a third ~~message~~ numerical value reflecting information relating to the value of the first state variable at time t_3 in simulation time in the first model; and

wherein the first ~~message~~ numerical value, second ~~message~~ numerical value, and third ~~message~~ numerical value are consecutive within said first series of state-related messages; and $t_2-t_1 \neq t_3-t_2$.

7. (Previously Presented) The system of claim 1, wherein:

said first ~~set of programming instructions~~ executing process exposes a first interface for the first model, where said first interface:

prevents access by said second ~~set of programming instructions~~ executing process to a first substantial portion of the first model, and

allows access by said second ~~set of programming instructions~~ executing process to a second substantial portion of the first model; and

said second ~~set of programming instructions~~ executing process exposes a second interface for the second model, where said second interface:

prevents access by said first ~~set of programming instructions~~ executing process to a first substantial portion of the second model, and

allows access by said first ~~set of programming instructions~~ executing process to a second substantial portion of the second model.

8. (Previously Presented) The system of claim 1, wherein

the first model has a third state variable;

each ~~message~~ numerical value in said first series of state-related ~~messages~~ numerical values further reflects information relating to the value of the third state variable at point t_m in simulation time; and

the second model also takes the third state variable as an input from said first series of state-related ~~messages~~ numerical values.

9. (Previously Presented) A method for simulating operation of a physical system having a plurality of physical subsystems, comprising:

simulating a first physical subsystem with a first continuous-time simulation;

accepting a request for export of information relating to a number *n* of state-related variables that characterize the state of the first physical subsystem in said simulating;

sending a first series of state-related messages, each message containing information relating to the value of at least one of the *n* state-related variables; and

simulating a second physical subsystem with a second continuous-time simulation; wherein:

~~the request is made in conjunction with said simulating a second physical subsystem;~~

the first physical subsystem interacts with the second physical subsystem; and

the at least one state-related variable characterizes at least a portion of the interaction between the first physical subsystem and the second physical subsystem.

10. (Original) The method of claim 9, wherein:

said simulating a first physical subsystem is performed on a first processor, and

said simulating a second physical subsystem is performed on the first processor.

11. (Original) The method of claim 9, wherein:

said simulating a first physical subsystem is performed on a first processor, and

said simulating a second physical subsystem is performed on a second processor.

12. (Previously Presented) The method of claim 9, wherein the number *n* is at least two.

13. (Previously Presented) The method of claim 12, wherein the number *n* is at least four.

14. - 15. (Cancelled)

16. (Previously Presented) The method of claim [[15]] 12, further comprising sending a third series of state-related ~~messages~~ numerical values, wherein:

at least one numerical value in the first series of state-related numerical values contains information relating to the values of a first proper subset of the set containing all *n* state-related variables;

at least one ~~message~~ numerical value in the third series of state-related ~~messages~~ numerical values contains information relating to the values of a second proper subset of the set containing all *n* state variables, and

the second proper subset is different from the first proper subset.

17. (Previously Presented) The method of claim 16, wherein:

the messages in the first series of state-related ~~messages~~ numerical values are sampled at a first rate in simulation time in the first model;

the ~~messages~~ numerical values in the third series of state-related ~~messages~~ numerical values are sampled at a second rate in simulation time in the first model; and

the first rate and the second rate are not equal.

18. (Previously Presented) The method of claim 16, wherein:

the ~~messages~~ numerical values in the first series of state-related ~~messages~~ numerical values are sampled at a first rate in simulation time in the first model;

the ~~messages~~ numerical values in the third series of state-related ~~messages~~ numerical values are sampled at a second rate in simulation time in the first model; and

the first rate and the second rate are equal.

19. (Previously Presented) The method of claim 9, wherein:

a given process makes the request; and

said sending directs the first series of state-related ~~messages~~ numerical values to a process different from the given process.

20. (Previously Presented) The method of claim 9, further comprising:

receiving the first series of state-related ~~messages~~ numerical values in a first output process in communication with a first output device; and

sending to the first output device a first set of information carried by a plurality of ~~messages~~ numerical values in the first series of state-related ~~messages~~ numerical values; and

wherein the first output device is in communication with the first output process.

21. - 23. (Cancelled)

24. (Previously Presented) The ~~system~~ method of claim 20, wherein said displaying comprises graphing a function of the first state-related variable versus ~~time~~ an independent variable.

25. (Previously Presented) The method of claim 20, further comprising:

receiving a second series of state-related ~~messages~~ numerical values in the first output process; and

sending to the first output device a second set of information ~~carried~~ represented by a plurality of ~~messages~~ numerical values in the second series of state-related ~~messages~~ numerical values; and

wherein said sending steps comprise outputting time information associating the first set of information and the second set of information with a system time.

26. (Previously Presented) The method of claim 20, further comprising:

receiving a second series of state-related ~~messages~~ numerical values in a second output process, which is in communication with a second output device; and

outputting to the second output device a second set of information carried by a plurality of ~~messages~~ numerical values in the second series of state-related ~~messages~~ numerical values;

wherein said sending comprises associating the first set of information with a system time; and

said outputting comprises associating the second set of information with ~~the system time~~ an independent variable.

27. (Previously Presented) A system, comprising:

a first computer-readable medium encoded with programming instructions executable in a first process to:

implement a first continuous-time simulation model solved with a numerical solver;

accept a first command signal; and

manage the first simulation model based on the first command signal;

a second computer-readable medium encoded with a second set of programming instructions executable in a second process to:

implement a second continuous-time simulation model solved with a numerical solver;

accept a second command signal; and

manage the second simulation model based on the second command signal; and

a third computer-readable medium encoded with a third set of programming instructions executable in a third process to:

send the first command signal to said first process; and

send the second command signal to said second process.

28. (Original) The system of claim 27, wherein said managing steps are synchronized to a common system time.

29. (Currently Amended) ~~[1, with state-space model]~~ The system of claim 1, wherein the first model is a state-space model.

30. (Currently Amended) ~~[1, with resistor-companion model]~~ The system of claim 1, wherein the first model is a resistor-companion model.

31. (Currently Amended) ~~[1, with different solvers]~~ The system of claim 1, wherein:

the implementation of the first continuous-time model uses a first numerical integration technique, and

the implementation of the second continuous-time model uses a second numerical integration technique.

32. (Currently Amended) ~~[10, but depending from claim 1]~~ The system of claim 1, wherein:

the first executing process and the second executing process are executed on a first processor.

33. (Currently Amended) ~~[11, but depending from claim 1]~~ The system of claim 1, wherein:
the first executing process is executed on a first processor, and
the second executing process is executed on a second processor.

34. (Currently Amended) ~~[16, with same destinations]~~ The method of claim 16, wherein:
the second series of state-related numerical values is sent to a first destination; and
the third series of state-related numerical values is sent to the first destination.

35. (Currently Amended) ~~[16, with different destinations]~~ The method of claim 16, wherein:
the second series of state-related numerical values is sent to a first destination; and
the third series of state-related numerical values is sent to a second destination.

36. (Currently Amended) ~~[24, graph v. time]~~ The system of claim 24, wherein the independent variable is time.

37. (Currently Amended) ~~[24, graph v. state variable of same subsystem]~~ The system of claim 24, wherein the independent variable is one of the n state-related variables.

38. (Currently Amended) ~~[24, graph v. state variable of other subsystem]~~ The system of claim 24, wherein the independent variable is a state-related variable in the simulation of the second physical subsystem.

39. (Currently Amended) ~~[>=1 subsystem is ODE]~~ A computing system for simulating a physical system, the physical system comprising two or more subsystems, the computing system comprising a plurality of computing devices, each simulating a subsystem of the physical system, wherein:

at least one subsystem is simulated by computationally solving a system of ordinary differential equations;

each subsystem simulation either

provides a series of output messages to another subsystem simulation, where the output messages encode state-related data from the subsystem, or

receives a series of input messages from another subsystem simulation, where the input messages encode state-related data from the other subsystem simulation, or

both provides a series of output messages to another subsystem simulation, where the output messages encode state-related data from the subsystem, and receives a series of input messages from another subsystem simulation, where the input messages encode state-related data from the other subsystem simulation; and

the computing system provides an output signal from at least one of the subsystem simulations.

40. (Currently Amended) ~~[>O(*n*) speed increase from division of problem]~~ In a distributed simulation of a physical system, the improvement comprising:

running a continuous-time simulation of the physical system in a set of *n* computing devices;

wherein the running occurs with a speed greater than $O(n)$ times the speed of the simulation using a single one of the computing devices.

41. (Currently Amended) ~~[... better than $O(n^2)$]~~ The system of claim 40, wherein the running occurs with a speed greater than $O(n^2)$ times the speed of the simulation using a single one of the computing devices.

42. (Currently Amended) ~~[... better than $O(n^3)$]~~ The system of claim 40, wherein the running occurs with a speed that is at least $O(n^3)$ times the speed of the simulation using a single one of the computing devices.